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(54) Method and device for stacking thin objects

(57) The present invention concerns a method for stacking thin objects, whereby the objects are fed in an overlapping manner with a preceding object lying partially on top of a following object, and are pushed one under the other against a stop (4), such that the stack is formed from bottom to top. At a distance from the stop (4) which is smaller than the distance between successive overlapping objects, an air line is created from under the stack being formed, such that the bottommost object is blown upward to make a following object go underneath it up against the stop (4). The invention also concerns a device for carrying out this method. This device contains means to create a vertical air line near the stop (4).

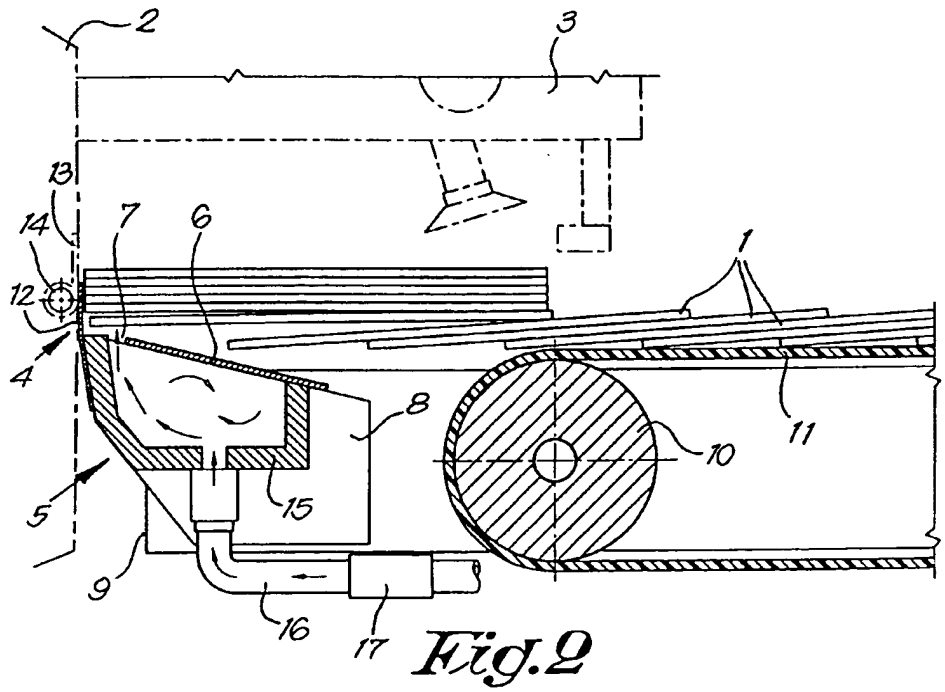

Fig.2

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Description

[0001] The present invention concerns a method for stacking thin objects, in particular envelopes, whereby the objects are fed in an overlapping manner with a preceding object lying partially on top of a following object, and are pushed one under the other against a stop, such that the stack is formed from bottom to top.

[0002] Such methods are applied to form a small stack under the suction part of the supply of a printing press with a continuous load for printing envelopes.

[0003] Instead of feeding the envelopes quickly one by one and putting them in the press by means of said suction part, the envelopes are fed at a more limited speed but partially overlapping one another, and they are stacked into a small stack at the input of the press, under the suction part. While the stack is being formed from beneath, the suction part always picks the top envelope from the stack to provide it in the press.

[0004] The formation of the stack by pushing the envelopes one under the other often causes problems as the envelopes catch one another or stick to one another with their flaps. This often occurs with window envelopes and pocket envelopes with a self-adhesive flap lying open.

[0005] In order to prevent the envelopes from catching one another, it is known to frontally blow air from the press onto the stack being formed.

[0006] This blowing, however, makes the envelopes inflate and rebound, which may result in wrong creases and standstills during the printing.

[0007] The invention aims a method for stacking thin objects which avoids the above-mentioned disadvantages and allows for a flawless stacking from bottom to top, in particular of envelopes being fed to a printing press.

[0008] This aim is reached according to the invention in that, at a distance from the stop which is smaller than the distance between successive overlapping objects, an air line is created from under the stack being formed, such that the bottommost object is blown upward to make a following object go underneath it up against the stop.

[0009] The air line is preferably blown through a table which is erected between the stop and for example an endless conveying device which feeds the objects.

[0010] The stack can be formed under the suction part of the supply of the printing press.

[0011] As objects, envelopes can be fed and stacked.

[0012] The air flow can be adjusted as a function of the weight of the objects.

[0013] The invention also aims a device which is particularly appropriate for applying the method according to any of the preceding embodiments, and which, in a simple manner, provides for a flawless stacking without any risk of wrong creases or breakdowns during the further processing, in particular the printing in a printing press.

[0014] In particular, the invention also concerns a device for stacking thin objects, particularly envelopes, which are fed in an overlapping manner with a preceding object lying partially on top of a following object, against a stop, characterised in that it contains means to create a vertical air line near the stop.

[0015] These means for creating an air line preferably contain a blowing room which is provided with an air slot in its top wall and means for supplying air under pressure to the blowing room.

[0016] The top wall of the blowing room is preferably inclined upward towards the stop.

[0017] The distance between the stop and the air slot is for example about 1 cm.

[0018] The device can be part of the supply of a printing press, whereby the stop or a part thereof can be part of said printing press. Thus, the blowing room can have an upward directed edge which is connected to a stop of the printing press.

[0019] The blowing room can then be erected between the printing press and an endless feeding conveyor device.

[0020] In order to better explain the characteristics of the invention, the following preferred embodiment of a method and device for stacking thin objects according to the invention are described as an example only without being limitative in any way, with reference to the accompanying drawings, in which:

figure 1 represents a top view of a device for stacking envelopes according to the invention, which is part of the supply of a printing press, and represented while stacking;
figure 2 represents a section according to line II-II in figure 1;
figure 3 schematically represents the entire transport mechanism from the envelopes to the printing press;
figure 4 represents the part which is indicated by F4 in figure 3 to a larger scale.

[0021] The device for stacking envelopes 1 from underneath represented in figures 1 and 2 is part of the supply of a continuously fed sheet-fed machine 2, of which is only represented a part by means of a chain line in figure 2, and is erected under the suction part 3 of this printing press 2. This suction part 3 is provided with moveable suction cups in a known manner.

[0022] The device itself mainly consists of a stop 4 and a blowing room 5 erected against it whose top wall 6 is provided with an air slot 7 for creating a vertical air line.

[0023] The two standing end walls 8 of the blowing room 5 are fixed to the two standing walls 9 of a conveying system. Of the latter is only represented a cylinder 10 which is erected between the standing walls 9 such that it can rotate and over which are moved a number of belts 11 upon which the envelopes 1 are sup-

plied.

[0024] This cylinder 10 is situated at a distance from the blowing room 5.

[0025] The top wall 6 of this blowing room 5 is inclined in a descending manner towards the cylinder 10, and the protruding edge of this top wall 6 is situated lower than the top side of the belts 11.

[0026] The air slot 7, however, is situated higher, at a distance from the stop 4 which is smaller than the distance between the successive overlapping envelopes 1 and which is for example about 1 cm.

[0027] On the side of the printing press 2, a plate is fixed to the blowing room 5 which protrudes over the top wall 6 and which forms a protruding edge 12 which is part of the stop 4. This edge 12 is connected to a stop lath 13 which is fixed to a support 14 of the printing press 2 and which forms the stop 4 above the edge 12.

[0028] Via the bottom 15 of the blowing room 5, two air lines 16 open in this room 5. These air lines 16 are connected to a blowing device 17.

[0029] The working of the stacking device is as follows.

[0030] By means of the belts 11 which are driven by a motor which is not represented in the figures, the overlapping envelopes 1 to be stacked are fed, such that a following envelope 1 is situated with its front part under the rear part of the preceding envelope 1.

[0031] The envelopes 1 overlap one another with a part which is significantly larger than the distance between the air slot 7 and the stop 4, and they are normally situated with their flaps on the front side and with their sides to be printed on the top side.

[0032] Past the cylinder 10, there is no support anymore for the envelopes 1, and the front end of an envelope 1 thus falls down onto the inclined top wall 6 of the blowing room 5, as a result of which this end is guided upward again until it is situated above the air slot 7.

[0033] Air is continuously blown through the blowing device 17 via the air line 16 into the blowing room 5, where this air flows upward as an air line via the air slot 7.

[0034] Thanks to this air line, the front end of the above-mentioned envelope will be blown up slightly as soon as it is situated above the air slot 7, so that a following envelope 1 which is guided in a similar manner with its front end through the top wall 6 can be pushed under the preceding one without any problems.

[0035] While the printing press 2 is working continuously, a stack of some ten millimetres high is situated above the blowing room 5 which is thus always fed from beneath.

[0036] At the same time, the top envelope 1 is each time picked up by the suction cups of the suction part 3 and provided in the sheet-fed machine 2, so that the height of the stack remains practically constant.

[0037] As the air line is vertical, no air is blown in the envelopes 1. As the latter are lifted by the air while they are being pushed one under the other, the flaps of the envelopes 1 cannot hinder said pushing and there will also be less friction during the pushing, especially in the case of self-adhesive envelopes 1.

[0038] The above-described stacking d vice can be combined in an interesting manner with a device for the overlapping feeding of thin objects from a stack to a conveying device, whereby use is made of a vacuum.

[0039] Figure 3 schematically represents such a combination.

[0040] Here, the latter device for the overlapping feeding of envelopes 1 contains a rotor 18 which is provided with openings 19 and which can rotate around a stator 20 which is provided with a room 21 which opens into its outer perimeter via a slot 22 opposite the stack of envelopes 1 which is erected on top of the rotor 18.

[0041] The room 21 is connected to the suction side of the blowing device 17 via a line 23, which thus also forms a vacuum pump.

[0042] The rotor 18 is driven via belts by means of a cylinder 24 situated next to it, driven by a motor which is not represented, which is also part of an endless conveyor device 25 with belts 26, which are connected to a reversing device 27 with belts 28 which take over the envelopes 1 upside down and which are connected to the conveyor device with the cylinder 10 and the belts 11.

[0043] Each time an opening 19 or a series of openings 19 of the rotor 18 ends up or end up opposite the slot 22 of the stator 20, the bottommost envelope 1 of the stack is sucked along and is pushed away from underneath the stack up to the belts 26.

[0044] The above-mentioned stack cannot be fed directly at the input of the printing press 2, as this requires a temporary interruption of the supply and consequently does not allow for a continuous working.

[0045] Whereas, during the overlapping, one envelope 1 is placed on top of another one, after the reversal by the reversing device 27, the envelope 1 will be situated under the other one.

[0046] The envelopes 1 are thus fed to the blowing room 5 and are stacked in the above-described manner.

[0047] The air which is extracted from the stator 20 by the blowing device 17 is now fed to the blowing room 5.

[0048] It is clear that, the heavier the envelopes 1 are, the stronger the vacuum in the room 21 must be, and the more air will have to be extracted. The volume of blown air automatically also increases then, so that the air flow of the air line is adjusted to the weight of the envelopes 1.

[0049] Naturally, according to a variant, the feeding of the blow air to the blowing room 5 and the extraction of the suction air from the room 21 can be carried out by two different compressors.

[0050] The invention is by no means limited to the above-described embodiments represented in the accompanying drawings; on the contrary, such a method and device for stacking thin objects can be made in all sorts of variants while still remaining within the scope of the invention.

Claims

1. Method for stacking thin objects, whereby the objects are fed in an overlapping manner with a preceding object lying partially on top of a following object, and are pushed one under the other against a stop (4), such that the stack is formed from bottom to top, characterised in that at a distance from the stop (4) which is smaller than the distance between successive overlapping objects, an air line is created from under the stack being formed, such that the bottommost object is blown upward to make a following object go underneath it up against the stop (4).

2. Method according to claim 1, characterised in that the air line is blown through a table which is erected between the stop (4) and an endless conveying device (10-11) which feeds the objects.

3. Method according to claim 1 or 2, characterised in that the stack is formed under the suction part (3) of the supply of a printing press (2).

4. Method according to any of the preceding claims, characterised in that, as objects, envelopes (1) can be fed and stacked.

5. Method according to any of the preceding claims, characterised in that the air flow is adjusted as a function of the weight of the objects.

6. Method according to any of the preceding claims, characterised in that these objects are provided in an overlapping manner from a stack on a conveying device by means of a system with a vacuum suction, and in that the air which is extracted by this system is used to form the air line.

7. Device for stacking thin objects which are fed in an overlapping manner with a preceding object lying partially on top of a following object, against a stop (4), characterised in that it contains means to create a vertical air line near the stop (4).

8. Device according to claim 7, characterised in that these means for creating an air line preferably contain a blowing room (5) which is provided with an air slot (7) in its top wall (6) and means (17) for supplying air under pressure to the blowing room (5).

9. Device according to claim 7 or 8, characterised in that the top wall (6) of the blowing room (5) is preferably inclined upward towards the stop (4).

10. Device according to any of claims 7 to 9, characterised in that the distance between the stop (4) and the air slot (7) is about 1 cm.

11. Device according to any of claims 7 to 10, characterised in that it is part of the supply of a printing press (2).

12. Device according to claim 11, characterised in that the stop (4) or a part thereof takes over a function in the printing press (2).

13. Device according to claim 11 or 12, characterised in that the blowing room (5) has an upward directed edge (12) which is connected to a stop of the printing press (2).

14. Device according to any of claims 7 to 13, characterised in that the blowing room (5) is erected between the printing press (2) and an endless feeding conveyor device (10-11).

15. Device according to any of claims 7 to 14, characterised in that the blowing room (5) is connected to a vacuum room (21) of a device to put the objects in an overlapping manner from a stack on a conveyor device (25).

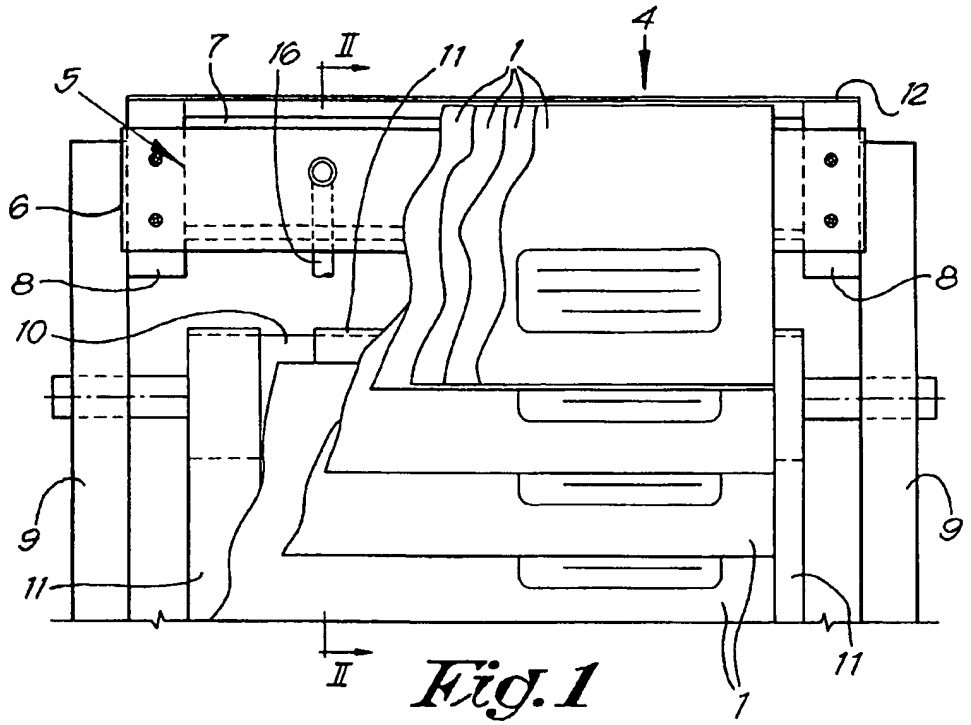
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Fig.1

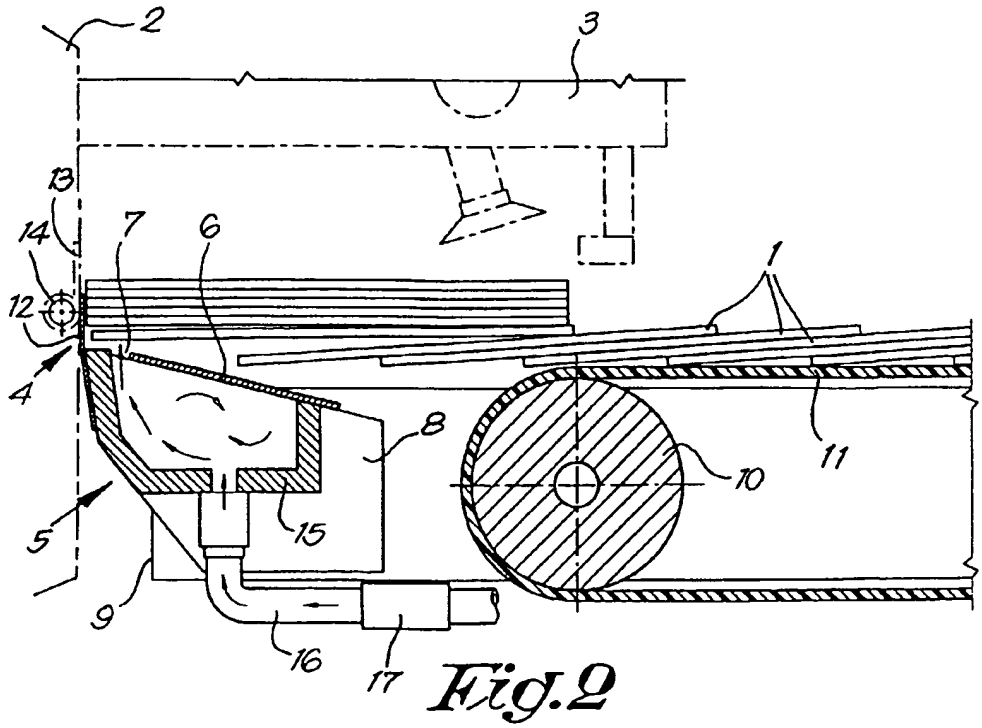
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Fig.2

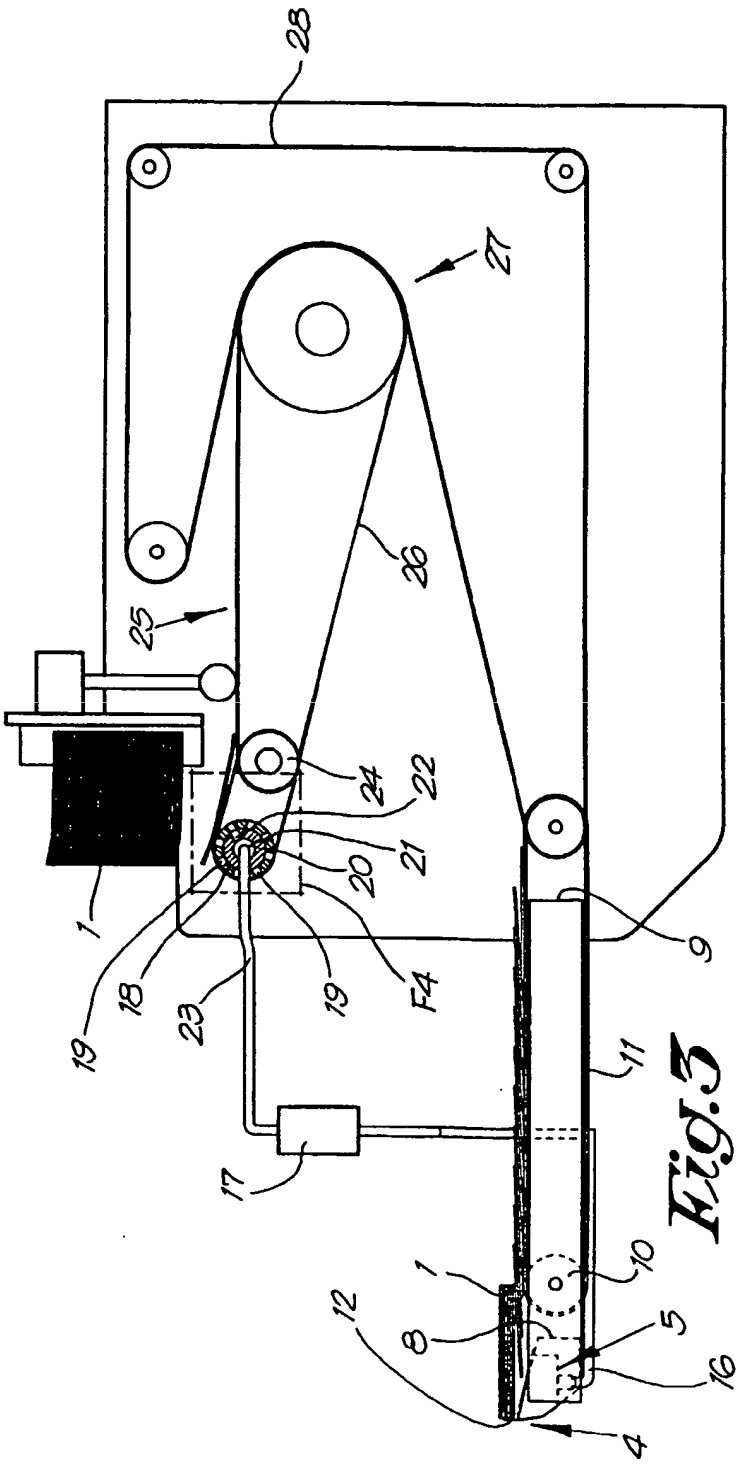
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Fig.3

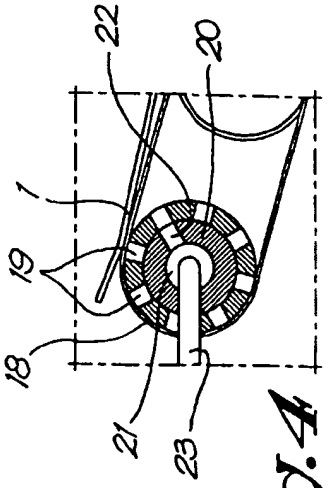
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Fig.4

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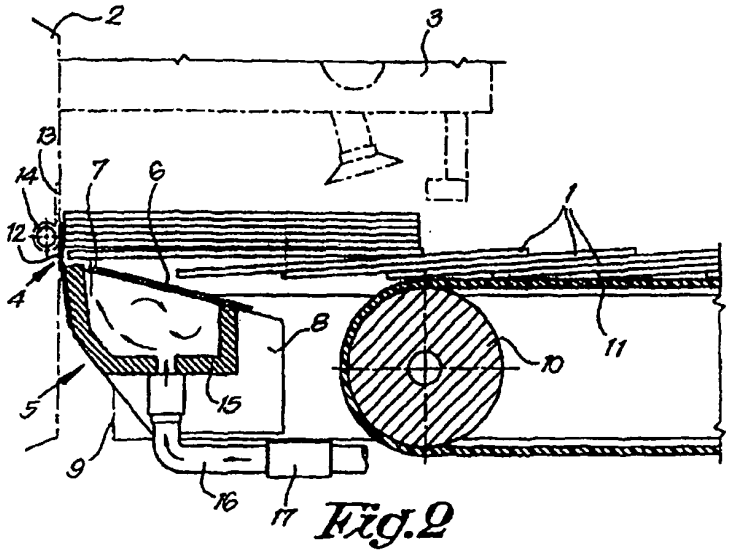

Fig.2

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EUROPEAN SEARCH REPORT

Application Number
EP 00 20 1484

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	PATENT ABSTRACTS OF JAPAN vol. 005, no. 090 (M-073), 12 June 1981 (1981-06-12) -& JP 56 037959 A (TOKYO ELECTRIC CO LTD), 11 April 1981 (1981-04-11) * abstract *	1,7	B65H29/18 B65H29/66 B65H29/24
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A	US 4 593 897 A (SILVERBERG MORTON) 10 June 1986 (1986-06-10) * column 1, line 62 - column 2, line 3 *		

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	10 August 2001	Pussemier, B

CATEGORY OF CITED DOCUMENTS

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